# Thermostat Prototype Project One Report

Developing a smart thermostat prototype for SysTec involves several critical requirements. The chosen microcontroller must support I2C for reading from a temperature sensor, GPIO for controlling an LED, GPIO interrupts for buttons, and UART to simulate data transmission. Additionally, it must support Wi-Fi connectivity and have adequate RAM and Flash memory. This report evaluates three microcontroller architectures—TI CC3220x LAUNCHXL, Microchip WFI32-IoT Development Board, and NXP (Freescale) Kinetis KW41Z—based on their ability to meet these requirements.

The TI CC3220x LAUNCHXL supports all required peripherals: I2C, GPIO, GPIO interrupts, and UART. It also includes built-in Wi-Fi capabilities for cloud communication. With 256KB of RAM and 1MB of Flash memory, it provides ample capacity for the project’s code (TI.com, n.d.). This makes the TI CC3220x a robust choice for the prototype.

The Microchip WFI32-IoT series is another viable option. It features integrated LEDs, user-configurable buttons, and an onboard temperature sensor. It supports GPIO, I2C, and UART, and includes Wi-Fi capabilities. With 512KB of RAM and 2MB of Flash memory, it offers sufficient capacity for the necessary code (Microchip.com, n.d.). The extensive memory and integrated peripherals make the Microchip WFI32-IoT an excellent choice.

The NXP Kinetis KW41Z supports I2C, GPIO, GPIO interrupts, and UART, with built-in Wi-Fi capabilities. It features 128KB of RAM and 512KB of Flash memory, adequate for the project’s code (NXP.com, n.d.). Despite slightly less memory capacity, it remains a viable choice.

Each microcontroller supports the necessary peripherals for the thermostat project. The TI CC3220x LAUNCHXL supports I2C, GPIO, GPIO interrupts, and UART, with built-in Wi-Fi. The Microchip WFI32-IoT supports I2C, GPIO, GPIO interrupts, and UART, with integrated temperature sensors, LEDs, buttons, and Wi-Fi. The NXP Kinetis KW41Z supports I2C, GPIO, GPIO interrupts, and UART, with built-in Wi-Fi. All three microcontrollers support Wi-Fi connectivity, enabling cloud communication for data transmission and remote control using standard network protocols like TCP/IP.

The TI CC3220x LAUNCHXL features integrated Wi-Fi for easy cloud connection. The Microchip WFI32-IoT includes Wi-Fi support for seamless cloud connectivity. The NXP Kinetis KW41Z supports Wi-Fi for effective cloud communication. Flash memory stores program code, and RAM holds executing code and variables. The TI CC3220x LAUNCHXL has 256KB of RAM and 1MB of Flash memory. The Microchip WFI32-IoT has 512KB of RAM and 2MB of Flash memory. The NXP Kinetis KW41Z has 128KB of RAM and 512KB of Flash memory.

In conclusion, the TI CC3220x LAUNCHXL and Microchip WFI32-IoT development boards are excellent choices for the smart thermostat prototype, meeting all peripheral, connectivity, and memory requirements. The NXP Kinetis KW41Z also fulfills the project specifications but offers slightly less memory. Leveraging these technologies, SysTec can develop a reliable and innovative smart thermostat that enhances customer experience and operational efficiency.

# References

Microchip. (n.d.). WFI32-IoT Development Board. Retrieved from Microchip.com NXP. (n.d.). Kinetis KW41Z. Retrieved from <https://www.microchip.com/en-us/development-tool/EV36W50A>

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